CLAIMS

WE CLAIM:

1. A multiple layered non-PVC containing tubing comprising:

a first layer of a polymer blend of: (a) from about 25% to about 50% by weight of the first layer a first polyolefin selected from the group consisting of polypropylene and polypropylene copolymers, (b) from about 0 to about 50% by weight of the first layer a second polyolefin selected from the group consisting of ethylene copolymers, ultra-low density polyethylene, polybutene, polybutadiene and butene ethylene copolymers; (c) from about 0% to about 40% by weight of the first layer a radio frequency susceptible polymer selected from the group consisting of polyamides, ethylene acrylic acid copolymers, ethylene methacrylic acid copolymers, polyimides, polyurethanes, polyesters, polyureas, ethylene vinyl acetate copolymers with a vinyl acetate comonomer content from 12%-50% by weight of the copolymer, ethylene methyl acrylate copolymers with methyl acrylate comonomer content from 12%-40% by weight of the copolymer, ethylene vinyl alcohol with vinyl alcohol comonomer content from 12%-70% by mole percent of the copolymer; (d) from about 0% to about 40% of a first thermoplastic elastomer; and

a second layer disposed coaxially within the first layer and being a second thermoplastic elastomer.

2. The tubing of claim 1 wherein the polyamide is selected from a group consisting of: aliphatic polyamides resulting from the condensation reaction of diamines having a carbon number within a range of 2-13, aliphatic polyamides resulting from a condensation reaction of di-acids having a carbon number within a range of 2-13, polyamides resulting from the condensation reaction of dimer fatty acids, and amide containing copolymers.

3. The tubing of claim 1 wherein the polyamide is a dimer fatty acid polyamide.

4. The tubing of claim 1 wherein the first polyolefin is a propylene copolymerized with a monomer selected from the group consisting of α-olefins having from 2-17 carbons.

5. The tubing of claim 4 wherein the first polyolefin is a propylene and ethylene copolymer having an ethylene content of from about 1% to about 8% by weight of the first polyolefin.

6. The tubing of claim 1 wherein the first thermoplastic elastomer is selected from the group consisting of a first styrene and hydrocarbon copolymer.

7. The tubing of claim 6 wherein the first styrene and hydrocarbon copolymer is selected from the group of polymers structures with diblock, triblock, radial block, and star block.

8. The tubing of claim 7 wherein the first thermoplastic elastomer is a styrene-ethylene-butene-styrene block copolymer.

9. The tubing of claim 7 wherein the first thermoplastic elastomer is functionalized with a group selected from the group consisting of carboxylic acid, esters of carboxylic acids, anhydrides of carboxylic acids, epoxides, and carbon monoxide.

10. The tubing of claim 9 wherein the first thermoplastic elastomer is maleic anhydride functionalized.

11. The tubing of claim 1 wherein the second thermoplastic elastomer is selected from the group consisting of a second styrene and hydrocarbon copolymer.

12. The tubing of claim 11 wherein the second styrene and hydrocarbon copolymer is selected from the group of polymer structures with diblock, triblock, radial block, and star block.

13. The tubing of claim 12 wherein the second thermoplastic elastomer is selected from the group consisting of a styrene-ethylene-butene-styrene copolymer, styrene-isoprene-styrene and styrene-ethylene-propylene.

14. The tubing of claim 13 wherein the second thermoplastic elastomer contains styrene-ethylene-butene-styrene diblock copolymer and a styrene-ethylene-butene-styrene triblock copolymer.

15. The tubing of claim 1 wherein the second polyolefin is an ethylene copolymerized with a monomer selected from the group consisting of α-olefins.

16. The tubing of claim 15 wherein the ethylene and α-olefin copolymer is obtained using a single-site catalyst.

17. The tubing of claim 1 wherein the second layer further comprises an additive selected from the group consisting of polypropylene, high density polyethylene, silica, slip agents, fatty amides, and acrawax.

18. The tubing of claim 17 wherein the additive is present in an amount by weight of the second layer from about 0% to about 20%.

19. A multiple layered non-PVC containing tubing comprising:

an outer layer of a polymer blend of: (a) from about 0% to about 60% by weight of the outer layer of a first polyolefin and (b) from about 40% to about 100% by weight of the outer layer of a first thermoplastic elastomer;

a core layer attached to the outer layer, the core layer is a polymer blend of: (a) from about 35% to about 100% by weight of the core layer of a second thermoplastic elastomer and (b) from about 0% to about 65% by weight of the core layer of a second polyolefin; and

an inner layer attached to the core layer on a side opposite of the outer layer, the inner layer being a polymer blend of: (a) from about 25% to about 55% by weight of the inner layer a third polyolefin, (b) from about 0 to about 50% by weight of the inner layer a fourth polyolefin selected from the group consisting of ethylene copolymers, ultra-low density polyethylene, polybutene, and butene ethylene copolymers; (c) from about 0% to about 40% by weight of the inner layer a radio frequency susceptible polymer selected from the group consisting of polyamides, ethylene acrylic acid copolymers, ethylene methacrylic acid copolymers, polyimides, polyurethanes, polyesters, polyureas, ethylene

vinyl acetate copolymers with a vinyl acetate comonomer content from 12%-50% by weight of the copolymer, ethylene methyl acrylate copolymers with methyl acrylate comonomer content from 12%-40% by weight of the copolymer, ethylene vinyl alcohol with vinyl alcohol comonomer content from 12%-70% by mole percent of the copolymer; and (d) from about 0% to about 40% by weight of the inner layer of a third thermoplastic elastomer.

20. The tubing of claim 19 wherein the polyamide is selected from a group consisting of: aliphatic polyamides re-sulting from the condensation reaction of di-amines having a carbon number within a range of 2-13, aliphatic polyamides resulting from a condensa-tion reaction of di-acids having a carbon number within a range of 2-13, polyamid-es resulting from the condensation reaction of dimer fatty acids, and amide containing copolymers.

21. The tubing of claim 19 wherein the polyamide is a dimer fatty acid polyamide.

22. The tubing of claim 19 wherein the first polyolefin is selected from the group consisting of a polypropylene homopolymer, a propylene copolymerized with a monomer selected from the group consisting of α-olefin s having from 2-17 carbons, ethylene homopolymers and ethylene copolymerized with a monomer selected from the group consisting of α-olefin s having from 2-17 carbons.

23. The tubing of claim 22 wherein the first polyolefin is a propylene and ethylene copolymer having an ethylene content of from about 1% to about 8% by weight of the first polyolefin.

24. The tubing of claim 19 wherein the second polyolefin is selected from the group consisting of a polypropylene homopolymer, a propylene copolymerized with a monomer selected from the group consisting of α-olefin s having from 2-17 carbons, ethylene homopolymers and ethylene copolymerized with a monomer selected from the group consisting of α-olefin s having from 2-17 carbons.

25. The tubing of claim 19 wherein the third polyolefin is selected from the group consisting of a polypropylene homopolymer, a propylene copolymerized with a monomer selected from the group consisting of α-olefin s having from 2-17 carbons, ethylene homopolymers and ethylene copolymerized with a monomer selected from the group consisting of α-olefin s having from 2-17 carbons.

26. The tubing of claim 19 wherein the first thermoplastic elastomer is selected from the group consisting of a first styrene and hydrocarbon copolymers.

27. The tubing of claim 26 wherein the first styrene and hydrocarbon copolymer is selected from the group of polymers structures with diblock, triblock, radial block, and star block.

28. The tubing of claim 27 wherein the first thermoplastic elastomer is selected from a first styrene-ethylene-butene-styrene copolymer, styrene-isoprene-styrene copolymer and styrene-ethylene-propylene-styrene copolymer.

29. The tubing of claim 28 wherein the first thermoplastic elastomer is a styrene-ethylene-butene-styrene diblock copolymer and a styrene-ethylene-butene-styrene triblock copolymer.

30. The tubing of claim 19 wherein the second thermoplastic elastomer is selected from the group consisting of a second styrene and hydrocarbon copolymers.

31. The tubing of claim 30 wherein the second styrene and hydrocarbon copolymer is selected from the group consisting of a polymer structure with diblock, triblock, copolymers, styrene and hydrocarbon star block copolymers, and blends containing the same.

32. The tubing of claim 31 wherein the second thermoplastic elastomer is selected from a second styrene-ethylene-butene-styrene copolymer, a second styrene-isoprene-styrene copolymer and a second styrene-ethylene-propylene-styrene copolymer.

33. The tubing of claim 19 wherein the third thermoplastic elastomer is selected from the group consisting of a third styrene and hydrocarbon copolymers.

34. The tubing of claim 33 wherein the third styrene and hydrocarbon copolymer is selected from the group consisting of polymer structure with diblock, triblock, star block copolymers and blends of the same.

35. The tubing of claim 34 wherein the third thermoplastic elastomer is a third styrene-ethylene-butene-styrene block copolymer.

36. The tubing of claim 34 wherein the third thermoplastic elastomer is functionalized with a group selected from the group consisting of carboxylic acid, esters of carboxylic acids, anhydrides of carboxylic acids, epoxides, and carbon monoxide.

37. The tubing of claim 36 wherein the third thermoplastic elastomer is maleic anhydride functionalized.

38. The tubing of claim 19 wherein the fourth polyolefin is an ethylene copolymerized with a monomer selected from the group consisting of α-olefins.

39. The tubing of claim 38 wherein the fourth polyolefin is an ethylene and α-olefin copolymer.

40. The tubing of claim 39 wherein the ethylene and α-olefin copolymer is obtained using a single-site catalyst.

41. A flowable material container closure assembly comprising:

(I) a port tube having a first layer and a second layer, (A) the first layer is a polymer blend of: (1) from about 25% to about 50% by weight of the first layer a first polyolefin selected from the group consisting of polypropylene and polypropylene copolymers, (2) from about 0 to about 50% by weight of the first layer a second polyolefin selected from the group consisting of ethylene copolymers, ultra-low density polyethylene, polybutene, polybutadiene and butene ethylene copolymers; (3) from about 0% to about

40% by weight of the first layer a radio frequency susceptible polymer selected from the group consisting of polyamides, ethylene acrylic acid copolymers, ethylene methacrylic acid copolymers, polyimides, polyurethanes, polyesters, polyureas, ethylene vinyl acetate copolymers with a vinyl acetate comonomer content from 12%-50% by weight of the copolymer, ethylene methyl acrylate copolymers with methyl acrylate comonomer content from 12%-40% by weight of the copolymer, ethylene vinyl alcohol with vinyl alcohol comonomer content from 12%-70% by mole percent of the copolymer; (4) from about 0% to about 40% of a first thermoplastic elastomer; and (B) the second layer is disposed coaxially within the first layer and is a second thermoplastic elastomer; and

(II) a membrane tube disposed coaxially within the port tube.

42. The assembly of claim 41 wherein the membrane tube has multiple layers.

43. The assembly of claim 42 wherein the membrane tube has an outer layer, an inner layer, the outer layer is capable of solvent bonding.

44. The assembly of claim 43 wherein the membrane tube further comprises a core layer positioned between the outer layer and the inner layer.

45. The assembly of claim 43 wherein the outer layer (A) is a polymer blend of: (1) from about 0% to about 60% by weight of the outer layer of a third polyolefin and (2) from about 40% to about 100% by weight of the outer layer of a third thermoplastic elastomer, the core layer (B) is attached to the outer layer, the core layer is a polymer blend of: (1) from about 35% to about 100% by weight of the core layer of a fourth thermoplastic elastomer and (2) from about 0% to about 65% by weight of the core layer of a fourth polyolefin; and (C) the inner layer is attached to the core layer on a side opposite of the outer layer, the inner layer is a polymer blend of: (1) from about 25% to about 55% by weight of the inner layer a fifth polyolefin, (2) from about 0 to about 50% by weight of the inner layer a sixth polyolefin selected from the group consisting of ethylene copolymers, ultra-low density polyethylene, polybutene, polybutadiene and butene ethylene copolymers; (3) from about 0% to about 40% by weight of the inner layer a radio frequency susceptible polymer selected from the group consisting of polyamides, ethylene acrylic acid copolymers, ethylene methacrylic acid copolymers, polyimides,

polyurethanes, polyesters, polyureas, ethylene vinyl acetate copolymers with a vinyl acetate comonomer content from 12%-50% by weight of the copolymer, ethylene methyl acrylate copolymers with methyl acrylate comonomer content from 12%-40% by weight of the copolymer, ethylene vinyl alcohol with vinyl alcohol comonomer content from 12%-70% by mole percent of the copolymer; and (4) from about 0% to about 40% by weight of the inner layer of a fifth thermoplastic elastomer.

46. The assembly of claim 41 wherein the polyamide is selected from a group consisting of: aliphatic polyamides re-sulting from the condensation reaction of di-amines having a carbon number within a range of 2-13, aliphatic polyamides resulting from a condensation reaction of di-acids having a carbon number within a range of 2-13, polyamides resulting from the condensation reaction of dimer fatty acids, and amide containing copolymers.

47. The assembly of claim 41 wherein the polyamide is a dimer fatty acid polyamide.

48. The assembly of claim 41 wherein the first polyolefin is a propylene copolymerized with a monomer selected from the group consisting of α-olefin s having from 2-17 carbons.

49. The assembly of claim 48 wherein the first polyolefin is a propylene and ethylene copolymer having an ethylene content of from about 1% to about 8% by weight of the first polyolefin.

50. The assembly of claim 41 wherein the second polyolefin is an ethylene copolymerized with a monomer selected from the group consisting of α-olefin s.

51. The assembly of claim 50 wherein the second polyolefin is an ethylene and α-olefin copolymer wherein the α-olefin has from 4 to 8 carbons.

52. The assembly of claim 51 wherein the ethylene and α-olefin copolymer is obtained using a single-site catalyst.

53. The assembly of claim 41 wherein the first thermoplastic elastomer is selected from the group consisting of a first styrene and hydrocarbon copolymer.

54. The assembly of claim 53 wherein the first styrene and hydrocarbon copolymer is selected from the group of styrene and hydrocarbon diblock copolymers, styrene and hydrocarbon triblock copolymers, styrene and hydrocarbon star block copolymers and blends of the same.

55. The assembly of claim 54 wherein the first thermoplastic elastomer is a first styrene-ethylene-butene-styrene block copolymer.

56. The assembly of claim 41 wherein the first thermoplastic elastomer is functionalized with a group selected from the group consisting of carboxylic acid, esters of carboxylic acids, anhydrides of carboxylic acids, epoxides, and carbon monoxide.

57. The assembly of claim 56 wherein the first thermoplastic elastomer is maleic anhydride functionalized.

58. The assembly of claim 41 wherein the second thermoplastic elastomer is selected from the group consisting of a second styrene and hydrocarbon copolymer.

59. The assembly of claim 58 wherein the second styrene and hydrocarbon copolymer is selected from the group if polymer structures with diblock copolymers, triblock, star block copolymers, and blends of the same.

60. The assembly of claim 59 wherein the second thermoplastic elastomer is a second styrene-ethylene-butene-styrene block copolymer.

61. The assembly of claim 60 wherein the second thermoplastic elastomer is a blend of a styrene-ethylene-butene-styrene diblock copolymer and a a styrene-ethylene-butene-styrene triblock copolymer.

62. A flowable material container closure assembly comprising:

(I) a port tube:

(II) a membrane tube disposed coaxially within the port tube, the membrane tube has an outer layer, a core layer and an inner layer, (A) the outer layer is a polymer blend of: (1) from about 0% to about 60% by weight of the outer layer of a first polyolefin and (2) from about 40% to about 100% by weight of the outer layer of a first thermoplastic elastomer, (B) the core layer is attached to the outer layer, the core layer is a polymer blend of: (1) from about 35% to about 100% by weight of the core layer of a second thermoplastic elastomer and (2) from about 0% to about 65% by weight of the core layer of a second polyolefin; and (C) the inner layer is attached to the core layer on a side opposite of the outer layer, the inner layer is a polymer blend of: (1) from about 25% to about 55% by weight of the inner layer a third polyolefin, (2) from about 0 to about 50% by weight of the inner layer a fourth polyolefin selected from the group consisting of ethylene copolymers, ultra-low density polyethylene, polybutene, and butene ethylene copolymers; (3) from about 0% to about 40% by weight of the inner layer a radio frequency susceptible polymer selected from the group consisting of polyamides, ethylene acrylic acid copolymers, ethylene methacrylic acid copolymers, polyimides, polyurethanes, polyesters, polyureas, ethylene vinyl acetate copolymers with a vinyl acetate comonomer content from 12%-50% by weight of the copolymer, ethylene methyl acrylate copolymers with methyl acrylate comonomer content from 12%-40% by weight of the copolymer, ethylene vinyl alcohol with vinyl alcohol comonomer content from 12%-70% by mole percent of the copolymer; and (4) from about 0% to about 40% by weight of the inner layer of a third thermoplastic elastomer.

63. The assembly of claim 62 wherein the port tube has a first layer and a second layer coaxially disposed within the first layer, the second layer is capable of solvent bonding to the outer layer of the membrane tube.

64. The assembly of claim 63 wherein (A) the first layer is a polymer blend of: (1) from about 25% to about 50% by weight of the first layer a fifth polyolefin selected from the group consisting of polypropylene and polypropylene copolymers, (2) from about 0 to about 50% by weight of the first layer a sixth polyolefin selected from the group consisting of ethylene copolymers, ultra-low density polyethylene, polybutene, polybutadiene and butene ethylene copolymers; (3) from about 0% to about 40% by weight of the first layer a

radio frequency susceptible polymer selected from the group consisting of polyamides, ethylene acrylic acid copolymers, ethylene methacrylic acid copolymers, polyimides, polyurethanes, polyesters, polyureas, ethylene vinyl acetate copolymers with a vinyl acetate comonomer content from 12%-50% by weight of the copolymer, ethylene methyl acrylate copolymers with methyl acrylate comonomer content from 12%-40% by weight of the copolymer, ethylene vinyl alcohol with vinyl alcohol comonomer content from 12%-70% by mole percent of the copolymer; (4) from about 0% to about 40% of a fourth thermoplastic elastomer; and (B) the second layer is a fifth thermoplastic elastomer.

65. The assembly of claim 62 wherein the first polyolefin is selected from the group consisting of a polypropylene homopolymer, a propylene copolymerized with a monomer selected from the group consisting of α-olefin s having from 2-17 carbons, ethylene homopolymers and ethylene copolymerized with a monomer selected from the group consisting of α-olefin s having from 2-17 carbons.

66. The assembly of claim 65 wherein the first polyolefin is a propylene and ethylene copolymer having an ethylene content of from about 1% to about 8% by weight of the first polyolefin.

67. The assembly of claim 62 wherein the second polyolefin is selected from the group consisting of a polypropylene homopolymer, a propylene copolymerized with a monomer selected from the group consisting of α-olefin s having from 2-17 carbons, ethylene homopolymers and ethylene copolymerized with a monomer selected from the group consisting of α-olefin s having from 2-17 carbons.

68. The assembly of claim 62 wherein the third polyolefin is selected from the group consisting of a polypropylene homopolymer, a propylene copolymerized with a monomer selected from the group consisting of α-olefin s having from 2-17 carbons, ethylene homopolymers and ethylene copolymerized with a monomer selected from the group consisting of α-olefin s having from 2-17 carbons.

69. The assembly of claim 62 wherein the fourth polyolefin is an ethylene copolymerized with a monomer selected from the group consisting of α-olefin s.

70. The assembly of claim 69 wherein the ethylene and α-olefin copolymer is obtained using a single-site catalyst.

71. The assembly of claim 62 wherein the first thermoplastic elastomer is selected from the group consisting of a first styrene and hydrocarbon copolymers.

72. The assembly of claim 71 wherein the first styrene and hydrocarbon copolymer is selected from the group consisting of polymer structures of diblock, triblock, star block and blends of the same.

73. The assembly of claim 72 wherein the first thermoplastic elastomer is a first styrene-ethylene-butene-styrene block copolymer.

74. The assembly of claim 73 wherein the first thermoplastic elastomer is a blend of a styrene-ethylene-butene-styrene diblock copolymer and a a styrene-ethylene-butene-styrene triblock copolymer.

75. The assembly of claim 62 wherein the second thermoplastic elastomer is selected from the group consisting of a second styrene and hydrocarbon copolymer.

76. The assembly of claim 14 wherein the second styrene and hydrocarbon copolymer is selected from the group of polymer structures consisting of diblock, triblock and star block copolymers.

77. The assembly of claim 76 wherein the second thermoplastic elastomer is a second styrene-ethylene-butene-styrene block copolymer.

78. The assembly of claim 62 wherein the third thermoplastic elastomer is selected from the group consisting of a third styrene and hydrocarbon copolymer.

79. The assembly of claim 78 wherein the third styrene and hydrocarbon copolymer is selected from the group of polymer structures consisting of diblock, triblock and star block.

80. The assembly of claim 79 wherein the third thermoplastic elastomer is a third styrene-ethylene-butene-styrene block copolymer.

81. The assembly of claim 62 wherein the third thermoplastic elastomer is functionalized with a group selected from the group consisting of carboxlic acid, esters of carboxylic acids, anhydrides of carboxylic acids, epoxides, and carbon monoxide.

82. The assembly of claim 81 wherein the third thermoplastic elastomer is maleic anhydride functionalized.

83. A flowable material container closure assembly comprising:

(I) a port tube having a first layer and a second layer, (A) the first layer is a polymer blend of: (1) from about 25% to about 50% by weight of the first layer a first polyolefin selected from the group consisting of polypropylene and polypropylene copolymers, (2) from about 0% to about 50% by weight of the first layer a second polyolefin selected from the group consisting of ethylene copolymers, ultra-low density polyethylene, polybutene, and butene ethylene copolymers; (3) from about 0% to about 40% by weight of the first layer a radio frequency susceptible polymer selected from the group consisting of polyamides, ethylene acrylic acid copolymers, ethylene methacrylic acid copolymers, polyimides, polyurethanes, polyesters, polyureas, ethylene vinyl acetate copolymers with a vinyl acetate comonomer content from 12%-50% by weight of the copolymer, ethylene methyl acrylate copolymers with methyl acrylate comonomer content from 12%-40% by weight of the copolymer, ethylene vinyl alcohol with vinyl alcohol comonomer content from 12%-70% by mole percent of the copolymer; (4) from about 0% to about 40% of a first thermoplastic elastomer; and (B) the second layer is disposed coaxially within the first layer and is a second thermoplastic elastomer; and

(II) a membrane tube disposed coaxially within the port tube, the membrane tube has an outer layer, a core layer and an inner layer, the outer layer (A) is a polymer blend of: (1) from about 0% to about 60% by weight of the outer layer of a third polyolefin and (2) from about 40% to about 100% by weight of the outer layer of a second component of a third thermoplastic elastomer, the core layer (B) is attached to the outer layer, the core layer is a polymer blend of: (1) from about 35% to about 100% by weight of the core layer of a fourth thermoplastic elastomer and (2) from about 0% to about 65% by weight of the

core layer of a fourth polyolefin; and (C) the inner layer is attached to the core layer on a side opposite of the outer layer, the inner layer is a polymer blend of: (1) from about 25% to about 55% by weight of the inner layer a fifth polyolefin, (2) from about 0% to about 50% by weight of the inner layer a sixth polyolefin selected from the group consisting of ethylene copolymers, ultra-low density polyethylene, polybutene, polybutadiene and butene ethylene copolymers; (3) from about 0% to about 40% by weight of the inner layer a radio frequency susceptible polymer selected from the group consisting of polyamides, ethylene acrylic acid copolymers, ethylene methacrylic acid copolymers, polyimides, polyurethanes, polyesters, polyureas, ethylene vinyl acetate copolymers with a vinyl acetate comonomer content from 12%-50% by weight of the copolymer, ethylene methyl acrylate copolymers with methyl acrylate comonomer content from 12%-40% by weight of the copolymer, ethylene vinyl alcohol with vinyl alcohol comonomer content from 12%-70% by mole percent of the copolymer; (4) from about 0% to about 40% by weight of the inner layer of a fifth thermoplastic elastomer.

84. The assembly of claim 83 wherein the polyamide is selected from a group consisting of: aliphatic polyamides re-sulting from the condensation reaction of di-amines having a carbon number within a range of 2-13, aliphatic polyamides resulting from a condensation reaction of di-acids having a carbon number within a range of 2-13, polyamides resulting from the condensation reaction of dimer fatty acids, and amide containing copolymers.

85. The assembly of claim 84 wherein the polyamide is a dimer fatty acid polyamide.

86. The assembly of claim 83 wherein the first polyolefin is a propylene copolymerized with a monomer selected from the group consisting of α-olefins having from 2-17 carbons.

87. The assembly of claim 86 wherein the first polyolefin is a propylene and ethylene copolymer having an ethylene content of from about 1% to about 8% by weight of the first polyolefin.

88. The assembly of claim 5 wherein the second polyolefin is an ethylene copolymerized with a monomer selected from the group consisting of α-olefins.

89. The assembly of claim 88 wherein the second polyolefin is an ethylene and α-olefin copolymer.

90. The assembly of claim 89 wherein the ethylene and α-olefin copolymer is obtained using a single-site catalyst.

91. The assembly of claim 89 wherein the first thermoplastic elastomer is selected from the group consisting of a first styrene and hydrocarbon copolymer.

92. The assembly of claim 91 wherein the first styrene and hydrocarbon copolymer is selected from the group of polymer structures consisting of diblock, triblock, and star block.

93. The assembly of claim 92 wherein the first thermoplastic elastomer is a first styrene-ethylene-butene-styrene block copolymer.

94. The assembly of claim 92 wherein the first thermoplastic elastomer is functionalized with a group selected from the group consisting of carboxlic acid, esters of carboxylic acids, anhydrides of carboxylic acids, epoxides, and carbon monoxide.

95. The assembly of claim 94 wherein the first thermoplastic elastomer is maleic anhydride functionalized.

96. The assembly of claim 92 wherein the second thermoplastic elastomer is selected from the group consisting of a second styrene and hydrocarbon copolymer.

97. The assembly of claim 96 wherein the second styrene and hydrocarbon copolymer is selected from the group of polymer structures consisting of diblock, triblock, and star block.

98. The assembly of claim 97 wherein the second thermoplastic elastomer is a second styrene-ethylene-butene-styrene block copolymer.

99. The assembly of claim 98 wherein the second thermoplastic elastomer is a styrene-ethylene-butene-styrene diblock copolymer and a styrene-ethylene-butene-styrene triblock copolymer.

100. The assembly of claim 97 wherein the third thermoplastic elastomer is a second styrene and hydrocarbon copolymer.

101. The assembly of claim 100 wherein the third thermoplastic elastomer is selected from the group of polymer structures consisting of diblock, triblock, and star block.

102. The assembly of claim 101 wherein the third thermoplastic elastomer is a blend of a styrene-ethylene-butene-styrene diblock copolymer and a a styrene-ethylene-butene-styrene triblock copolymer.

103. The assembly of claim 101 wherein the fourth thermoplastic elastomer is selected from the group consisting of a fourth styrene and hydrocarbon copolymers.

104. The assembly of claim 103 wherein the fourth styrene and hydrocarbon copolymer is selected from the group of polymer structures consisting of diblock, triblock, and star block copolymers.

105. The assembly of claim 104 wherein the fourth thermoplastic elastomer is a fourth styrene-ethylene-butene-styrene block copolymer.

106. The assembly of claim 104 wherein the fifth thermoplastic elastomer is selected from the group consisting of a fifth styrene and hydrocarbon copolymer.

107. The assembly of claim 106 wherein the fifth styrene and hydrocarbon copolymer is selected from the group of polymer structures consisting of diblock, triblock, and star block copolymers.

108. The assembly of claim 107 wherein the fifth thermoplastic elastomer is a fifth styrene-ethylene-butene-styrene block copolymer.

109. The assembly of claim 107 wherein the fifth thermoplastic elastomer is functionalized with a group selected from the group consisting of carboxylic acid, esters of carboxylic acids, anhydrides of carboxylic acids, epoxides, and carbon monoxide.

110. The assembly of claim 109 wherein the fifth thermoplastic elastomer is maleic anhydride functionalized.

111. The assembly of claim 107 wherein the first polyolefin, the third polyolefin, the fourth polyolefin and the fifth polyolefin are propylene copolymerized with ethylene, the ethylene being from about 1% to about 8% by weight of the copolymer, and the second polyolefin and the sixth polyolefin are ethylene and α-olefin copolymers wherein the α-olefin has from 4 to 8 carbons.